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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

FOREST INSECT SURVEY

LASSEN NATIONAL FOREST

1933

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Forest Insect Survey

Lassen National Forest

1933

Table of Contents

	Page
Introduction	1
History of Infestation	1
General Infestation Conditions	2
Insect Losses by Units	3,4,5,6,7,8
Infestation Problems	9,10
1933 Control Estimates (Revised)	11
Table 1	
Plate 1	
Map	

FOREST INSECT SURVEY

LASSEN NATIONAL FOREST

1933

K. A. SALMAN

Introduction

The work of extending forest insect surveys in the Lassen National Forest was facilitated greatly by the E.C.W. program which provided funds and personnel for conducting surveys and securing data preliminary to insect control. In addition it was possible to secure data of a general nature on the trends of the forest insect infestations in the Lassen, as well as secure additional data on the effects of the low temperatures during the winter of 1932 on the overwintering broods.

With the survey data as a basis, the following analysis of infestations and trends is possible and control recommendations can be made from the information at hand.

History of Infestations.

Previous to 1930 no forest insect surveys of a comprehensive nature has been undertaken in the northeastern part of the Lassen National Forest. Reconnaissance surveys of previous years had indicated heavy annual losses near Cone and Harvey Mountains and plot cruises on Harvey Mountain in connection with heptane production experiments had shown annual losses reaching a maximum of 130 trees and over 100,000 bd. feet per section.

In the fall of 1930 the Eastern Lassen Working circle was given a comprehensive survey using plots and traverses. In September 1931 and 1932 two other surveys were made including the same area as that of 1930 and in addition covering timber to the west towards Hall's Flat. The survey

of 1933 covered the same areas and in addition extended the work to the stands south and west of Poison Lake and to the timber belt north and west of the Harvey Mountain-Black Mountain divide.

The areas covered and plots cruised by the 1933 survey during the period of work are shown on the map accompanying this report.

General Infestation Conditions.

The winter of 1932-33, which resulted in minimum temperatures as low as -30 degrees F during February, caused considerable mortality in the overwintering broods of the western pine beetle in the area but apparently did not affect greatly the mountain pine beetle, flat head borer, jeffrey pine beetle and large california engraver beetle broods. Whether or not the low temperatures can be considered the critical factor, it was evident early this summer that the infestation in general had received a considerable setback. As the season progressed, however, it became certain that the western pine beetle brood was recuperating rapidly, the jeffrey pine beetle was continuing without interruption and that the other, so called secondary species of insects, were slightly more abundant than normal.

Fall cruises of plots in the area showed the infestation had little tendency to group in any particular localities and there were no definite indications of epidemic infestations. However, heavy losses were shown, particularly in the areas north of the Dow Butte-Black's Mountain divide as well as on the south slopes of Harvey and Ashurst Mountains and in the Cone Mountain Unit. Estimates based on the cruises as given in Table I, showed a probable decrease throughout the entire area of about 41% of the 1932 infestation. In spite of this general decrease average losses are at 126 b.m. per acre, a loss that is probably

considerably greater than the increment put on during the year in the overmature stands involved in the survey.

Fortunately the NIRA program of insect control included plans for treatment of infestations in the Lassen National Forest and, from the basic data secured by the cruises a selection of areas was made and work started around the first of November. From the standpoint of our estimates that is fortunate, for it was soon found that, utilizing the normal converting factor for estimating total loss from a partial sample of the seasonal activity, the results showed a much lower insect caused loss than actually had occurred. This discrepancy of results, using a factor that ordinarily has proven satisfactory, reveals that we are dealing with a rapidly increasing infestation this season, the result of a recuperation of insect broods during the summer from the blow dealt them during the winter of 1932-33. Attempt has been made to modify the estimates so as to accomodate the unforseen and unusual recuperation and increase but, under such conditions the estimates can only be considered as such and final exact tabulation of total losses will not be available until next season.

Insect Losses by Units.

Willow Springs Unit.

This area, having a gross acreage of over 51,000, contains a series of basins with exposure to the north containing a stand of ponderosa and jeffrey pine in proportions depending on conditions. Site quality is fairly poor being site IV or V in most places although better quality timber exists in pockets. Volume has been estimated at about 7-8 m.b.m. per acre. About 55% of the infestation is caused by primary species of insects although a large number of mixed brood trees, in which primary insects are

to be found.

The 1931 and 1932 infestations were epidemic in nature, groups of trees being attacked throughout the unit. The 1933 infestation, however, although causing a loss of about 133 b.m. per acre, a reduction of 45% of the 1932 loss, is scattered fairly evenly throughout the stand. Usually not more than small groups of two or three trees are to be found. A government control project was recommended for this area as accessibility and chances of utilization are good and the government holdings are solid and in the majority.

Dixie Valley Unit.

This unit contains three distinct types of stands. Along the southern margin of the unit is a mixed conifer site III stand on the north slopes of the Dow Butte-Black's Mountain divide. North of this lies a band of almost pure Jeffrey pine on a poorly drained bench land and, at the lower elevations to the north a site IV quality pure ponderosa pine stand occurs. The area is broken up by ridges running north and south and differences in type and timber quality are great within short distances.

To judge from the samples, cruised losses are heavy throughout the unit, almost regardless of quality of timber. The infestation is considered to be following about the same trends as are evident in the Willow Springs Unit. 1933 losses are estimated at about 187 b.m. per acre, about 22% less than in 1932. In spite of the heavy losses in this unit a government control project was not considered as about 50% of the area is privately owned, the government holdings being scattered and in the poorer type timber.

Slate Mountain Unit.

This unit has a gross acreage of 35,000 with type and ownership

somewhat similar to that im the Dixie Valley Unit. Estimated losses of about 133 b.m. per acre show only a 26% reduction since 1932, but it is evident that the 1932 infestation, although much above normal, did not have the distinct epidemic tendencies common to the two units previously discussed. No control was considered in this unit because of the relatively small government holdings.

Gordon Creek Unit.

This unit contains open mature stands entirely different from those in the adjoining Cave Mountain and Harvey Mountain units. The timber does not appear to have suffered from heavy losses as have the other two areas, although the reason is obscure. About 7,000 timbered acres are in the unit, the greater proportion government owned. The 1933 loss of about 88 b.m. per acre shows a reduction of 27% over that of 1932 and is considerably below the average for surrounding areas. Although 88 b.m. per acre is a considerable loss in good type timber, it cannot be considered alarming in view of the much higher losses in other units nearby.

Cave Mountain Unit.

Although the timber is distinctly a fringe type the present infestation of about 81 B.M. per acre compares favorably with that in the better type timber of the Gordon Creek Unit. In previous years the losses have run consistently higher, reaching a peak in 1932 with a loss of 159 b.m. per timbered acre. No control has been considered for the unit this season.

Brockman Flat Unit.

The basis for estimates in this unit is not as sound as in other units due to the fact that the cruise was made fairly early in the season and that there is much more chance that the use of the conversion factor will

result in a relatively great error. However, the estimated loss of 49 b.m. per acre will need considerable increase before the area should be considered for control, particularly in view of the fact that much of the area on the lava beds has been considered unmerchantable because of low volume per acre.

Logan Mountain.

No figures are given for this unit, which is largely cutover, because of the fact that the lack of samples would make considerable guesswork necessary. Losses in the uncut portion - that area previously considered as the McCoy Flat Unit - are much like those in the Brockman Unit, although the timber is of better quality. The establishment of either plots or traverses in this unit, both in the uncut and logged portions is desirable, not only in order to determine losses, but also as an adjunct to the regional survey studies to give indications of what is to be expected of insects in the reserve stands of logged areas.

Crater Mountain.

This area, which has been decreased to a timbered area of about 14,000 acres during the past few years through logging of approximately 4,000 acres of ponderosa pine type, continues to suffer relatively light losses although a peak occurred in 1932 and 1933 losses are heavier than were found during 1929 to 1931. No control has been considered necessary for the current infestation that is estimated to have caused a loss of about 69 b.m. per acre. The current loss is about 50% of the 1932 loss.

Harvey Mountain Unit.

Losses in this unit have been heavy since 1926, the heavier and more devastating losses centering in a belt along the lower slopes of Ashurst Mount-

ain and Harvey Mountain. The timber on the flats and towards the tops of the peaks has not suffered as heavily during the period in which surveys have been made. A start has been made at logging the area but, as yet, the heavier centers of infestation have not been touched. The 1934 season, which probably will see a considerable cut in the area should take out the centers of infestation as grades have been cut and some track laid. Per acre loss for 1933 is estimated at 113 b.m. per acre, which is 46% of the estimated 1932 loss.

Control was considered for this unit, more particularly the area outside the sale boundary which extends southerly along the range line between ranges 8 and 9 (T 33 N) and includes section 24. However, the fact that no cutting will occur for at least 15 years, unless that area is included in the present sale while the logging operations are in the vicinity, made it undesirable to attempt protection for that length of time. Protection under the conditions of infestation that are known to have existed since 1926 would be unduly costly.

Although it is not our purpose to propose disruption of management plans, unless some real benefits in reduction of insect caused losses may be obtained it is suggested that the possibility of including the timber to the west of the present sales boundary in the sale area should be considered. In the Bureau plot in section 23, T. 33 N, R 8 E, losses during the past eight years have ranged from 44 trees and 44,540 b.m. per section to a maximum of 170 trees and 187,320 b.m. Strip cruises in the better type timber of the area showed a loss of but 76 trees and 77,120 b.m. per section in 1932 and 24 trees and 28,660 b.m. estimated for 1933. However, this low 1933 loss has not been found to exist in the band of heavy infestation as witness

the plot results and another strip cruise along the east exposure of Cone Mountain. In this last named strip of 12 miles the losses were 114 b.m. and 148 b.m. per acre for 1932 and 1933.

Cone Mountain Unit.

Infestation in this unit, which was sampled by two plot cruises and 12 miles of traverse strip, showed an unexpectedly high rate of loss. Per acre losses were estimated at 147 b.m. for 1933 and 237 b.m. for 1932. The government has a considerable amount of timber in this unit but does not own a clear block, with the possible exception of the experimental forest, for which satisfactory insect control boundaries exist.

Bogard and Butte Creek Units.

These two units, recently included in the areas surveyed, have open type stands with relatively light losses and do not include hazardous areas at the present time. It is felt that the estimates of 103 and 96 b.m. per acre for 1933 may be high due to the error of using a conversion factor for early season cruise results. No control has been considered for either unit.

Willard Creek Unit.

In addition to the surveys conducted in the northeastern part of the forest a traverse and reconnaissance survey was made of the Willard Creek Unit in T 29 N, R 10 E. The 12 mile strip showed an estimated loss of only 46 b.m. per acre. Reconnaissance work of this and previous years has shown that, although the general infestation in the basis has peaks and depressions, in general the heavy losses are limited to the areas in which extremely poor site conditions exist. The condition of the stand in the greater part of the unit is indicative of a much better site than the usual east side type

and, unless losses become much heavier, it is probable that attempts at control would not pay.

Infestation Problems.

The Northeastern part of the Lassen Forest, a typical east side type of forest, presents numerous problems in addition to those connected with the apparently normal heavy losses in that type of area. Table I gives our estimates of total losses and average loss per section for the years for which data have been secured. Plate I illustrates the course of the infestation in the various units. These figures given can be considered as estimates only for with the change from virgin to cutover occurring in several units, the refinement in measuring acreage resulting in the elimination of all but timbered acres in type from the calculations, the necessity for changing the basis for the estimates has been apparent.

Average per acre loss on 21 cruised samples of 320 or more acres each showed a 1932 loss of 220 b.m. and an estimated 1933 loss of 133 b.m. The average per acre loss for the past five years, weighting the acreage cruised each year, is estimated at 138 b.m. per acre and the yearly average ranges from 55 b.m. per acre to 186 b.m. per acre. Inquiry of other agencies as to the annual increment in virgin stands in the Lassen has failed to give definite information on that point. Mr. Weeslander, of the Experiment Station, formerly on the Lassen forest, intimated an estimated 90 b.m. per acre increment on the Lassen Lumber and Box cutover. However, it is probably true that a net loss has resulted more often than a balanced loss in the five years covered by the record.

The figures given above, being averages of all conditions in the east side type of the Lassen, cannot be taken to indicate that all portions

of the pine stands are suffering a net loss each year for islands of better quality timber, often of west side type quality, are scattered through the stands wherever local environmental conditions permit.

The control of forest insect losses will be important in the future of the stands in the northeastern Lassen, particularly in the management or even in the cutting of areas. Although we have considerable data on the types of trees attacked by insects we still lack information concerning the proportions of those trees in the stands and the action of insects in cutover areas under the site conditions pertaining to the Northeastern Lassen. Future entomological work, in addition to continued cruises to determine losses, should include studies of the reserves on cutover lands and studies of the composition of the stands so that some contribution may be made in marking practices for future cuttings.

Control operations, until 1933, were foreign to the stands in this area. From experience in other pure ponderosa pine stands, it is possible to postulate that, without salvage, control in the lower altitudinal belt near the north end of the forest will not materially lessen the total losses although it might prevent definite outbreaks by primary species. The presente of jeffrey pine and the jeffrey pine beetle at the higher altitudes offers promising opportunities for control. It is to be expected, because of the habits of this insect that control, as now practiced, will find a place on the better site areas. However, the abundance of rocky slopes and poor site conditions in localized areas, spots in which normal losses are high, may be a considerable factor in making control effective only in part.

TABLE I

ESTIMATED PER SECTION AND UNIT LOSSES

LASSEN NATIONAL FOREST

UNIT	Acres Virgin Timber	1929 Per Sec. Trees	1929 Per Sec. Vol.BM	1929 Per Unit Trees	1929 Per Unit Vol.MBM	1930 Per Sec. Trees	1930 Per Sec. Vol.B.M.	1930 Per Unit Trees	1930 Per Unit Vol.MBM	1931 (2) Per Sec. Trees	1931 (2) Per Sec. Vol.B.M.	1931 (2) Per Unit Trees	1931 (2) Per Unit Vol.MBM	1932 Per Sec. Trees	1932 Per Sec. Vol BM	1932 Per Unit Trees	1932 Per Unit Vol.MBM	1933 Per Sec. Trees	1933 Per Sec. Vol.BM	1933 Per Unit Trees	1933 Per Unit Vol.MBM
Willow Springs	51,750													229	152,080	18500	12,288	100	84,970	8080	6,866
Dixie Valley	55,340													161	152,190	13920	13,164	103	127,560	8910	10,339
Slate Mtn	35,225													130	114,700	7150	6,308	71	84,900	3905	4,669
Gordon Cr	7,020	28	34,640	310	381	33	40,450	360	445	37	39,360	407	433	68	76,300	750	839	40	56,000	440	616
Cave Mtn	10,990	34	25,290	580	435	37	36,970	635	636	71	56,600	1220	977	108	101,700	1860	1,749	46	51,970	790	894
Brockman Flat	12,670	20	19,190	390	380	26	25,510	520	505	64	70,400	1260	1394	148	114,380	2930	2,265	54	31,890	1070	631
Logan Mtn	6,144																				
Crater Mtn	14,272	25	27,000	700	756	32	34,320	890	961	36	39,670	803	885	81	88,160	1806	1,966	37	44,400	825	990
Harvey Mtn	15,900	56	55,890	1400	1386	67	65,890	1660	1654	75	73,550	1860	1824	141	158,140	3500	3,922	68	72,610	1686	1,801
Cone Mtn	38,000					57	65,150	3366	3870	71	83,280	4217	4943	121	151,650	7187	9,008	75	94,270	4455	5,600
Bogard	19,800													52	80,000	1607	2,472	30	66,000	927	2,039
Butte Cr.	56,290													28	57,820	2464	5,088	32	61,710	2816	5,430
Ave. loss per acre B.M.					52				79				106				194				126

(1) Area planimetered by P.C. Johnson Dec. 1933. Nontimbered, cut of type and cutover areas excluded. Areas in Units 1-3 gross.

(2) Estimates for 1931 and for previous seasons corrected when necessary

1933 Control Estimates - Revised

Consideration of five areas and recommendations for control were made in a memorandum of September 5, 1933 to the Regional Forester. The recommendations as to the desirability of control in those areas remains as outlined there, units I, II and III being considered as satisfactory providing control can be followed by logging for salvage within a reasonable number of years. The data provided by the control project now under way, however, has provided material for amended estimates and indications that the infestation is recuperating rapidly from the depression caused by the low temperatures of last winter. These data are considered necessary in view of the unlooked for discrepancy between the actual figures and those obtained by use of a conversion factor. The estimate for the three units now being controlled is as follows:

No trees to be treated	3500
Treating per man day to date	1.4 trees
Estimated treatment per month	620 "
Estimated cost of project	$22,000

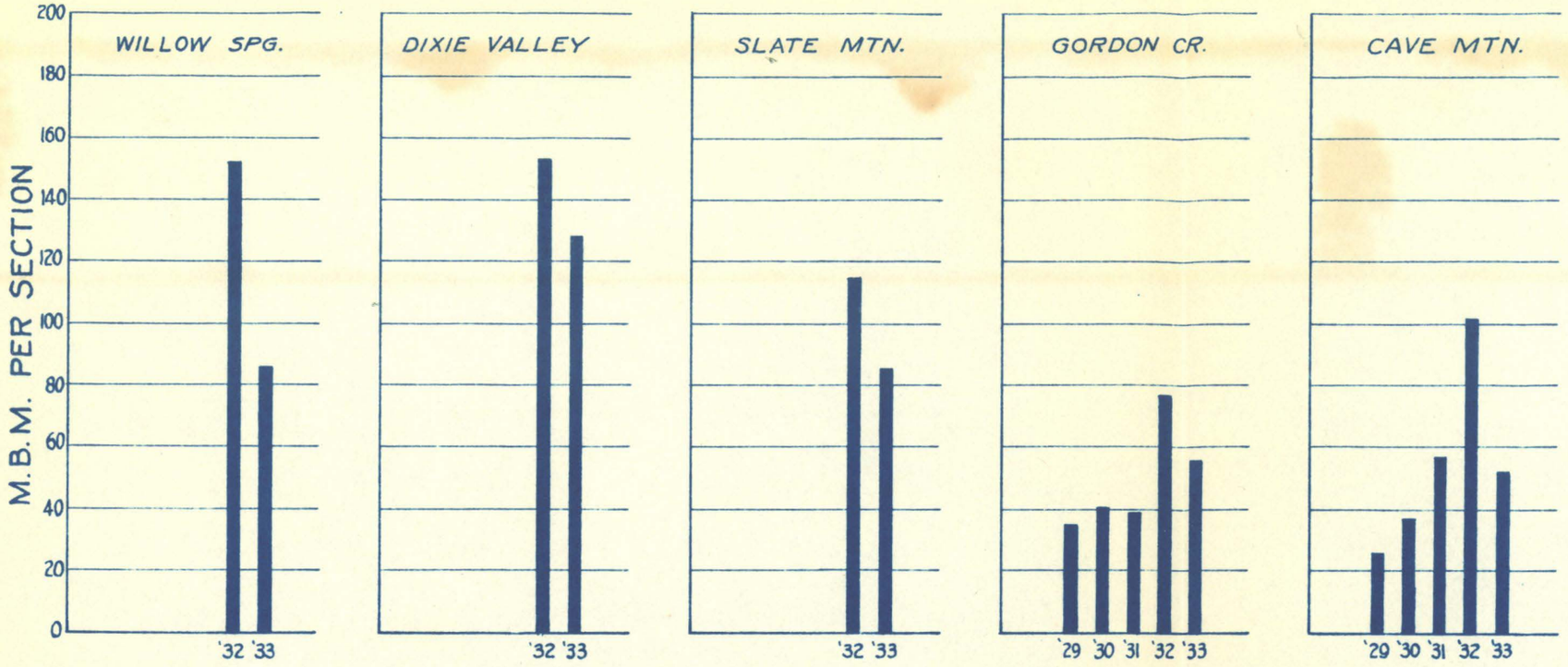
EASTERN LASSEN WORKING CIRCLE

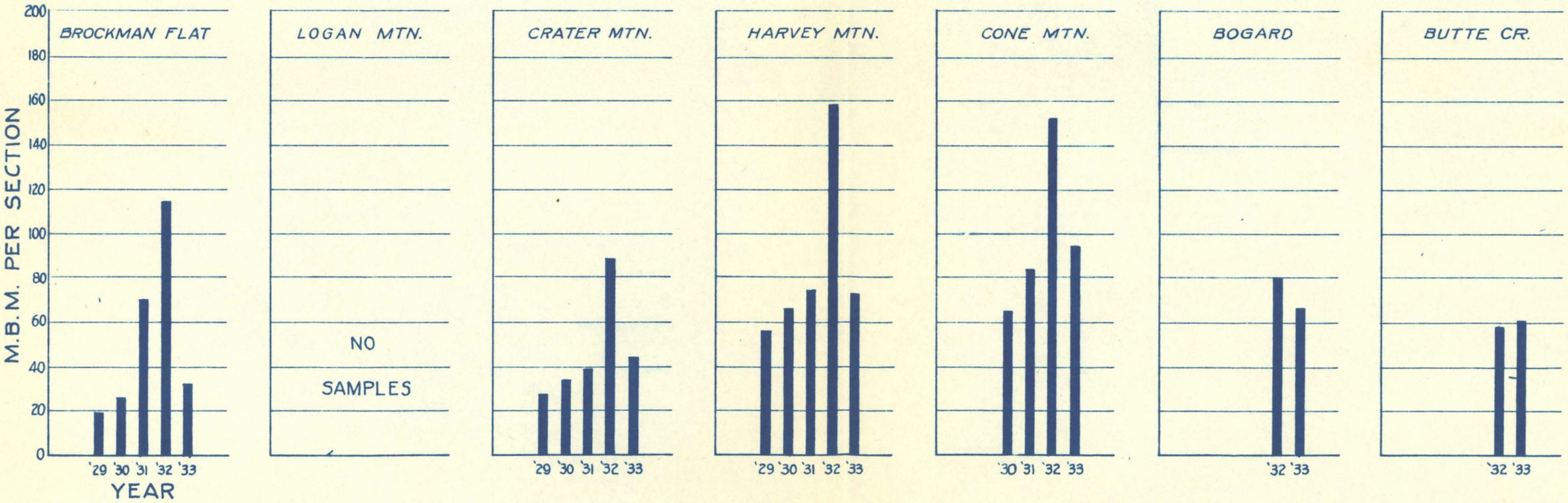
LASSEN NATIONAL FOREST
CALIFORNIA

INSECT LOSSES

1929–1933

ANNUAL M.B.M. LOSSES
PER SECTION BY UNITS





LASSEN NATIONAL FOREST
1933 REGIONAL SURVEY

PLOT
BOUNDARY – REGIONAL SURVEY AREA
BOUNDARY – INSECT CONTROL UNIT
1933-34 CONTROL PROJECT